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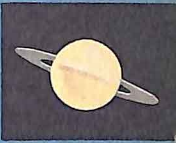
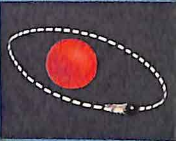
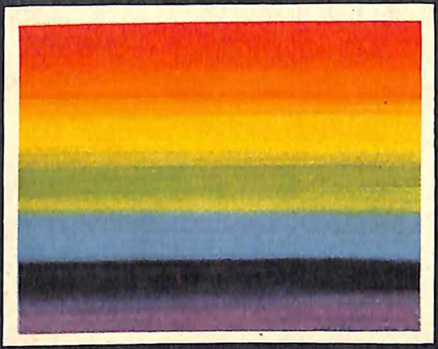
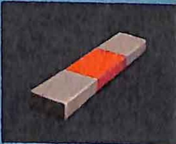
## READ ABOUT SCIENCE 3

# LIGHT









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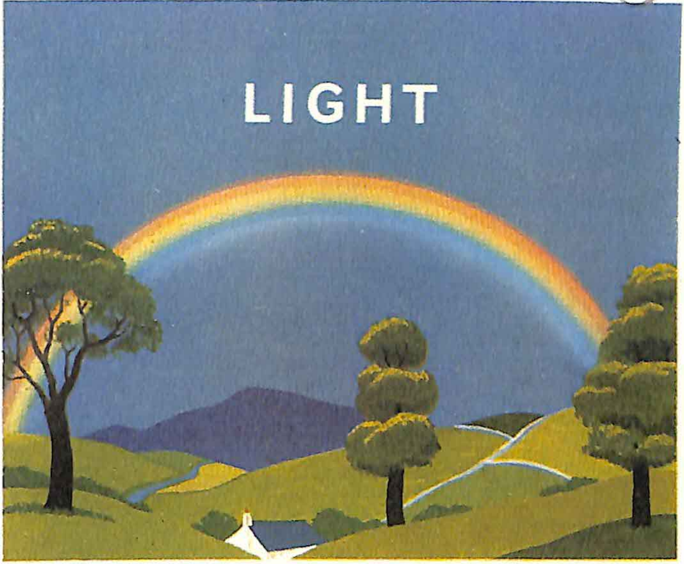
# LIGHT



Rainbows only appear when it is raining and the sun is shining.

But sunlight is almost white, so why is the rainbow full of colour?

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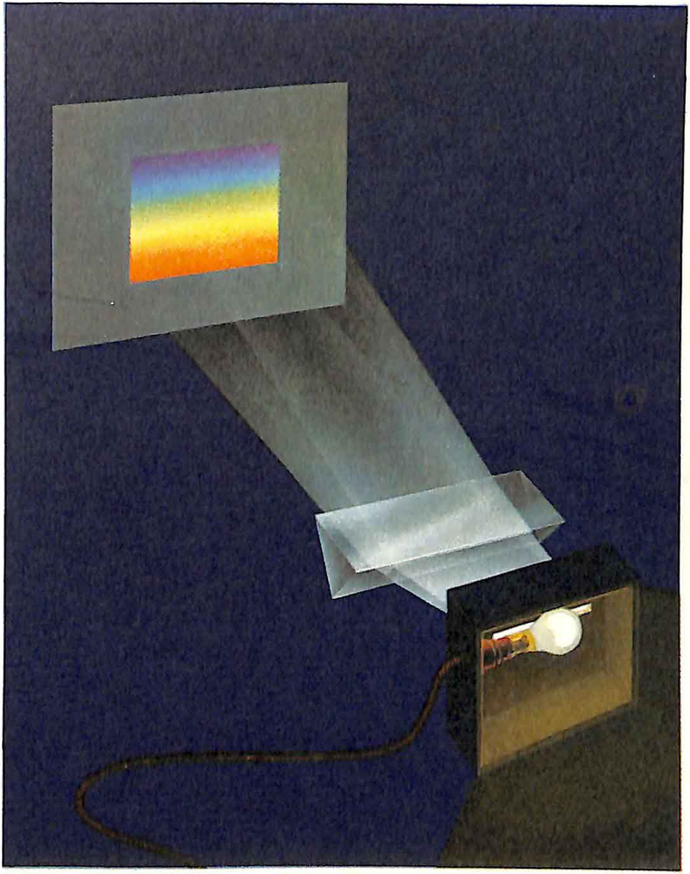
The colours appear when the straight rays of sunlight are being bent by the droplets of rain. You can make the same band of colours by bending sunlight, or electric light, with a glass prism.

Light travels, just as sound does. In a storm the lightning flash and the thunder start at the same time. But light travels much faster than sound, so we see the flash long before we hear the thunder.

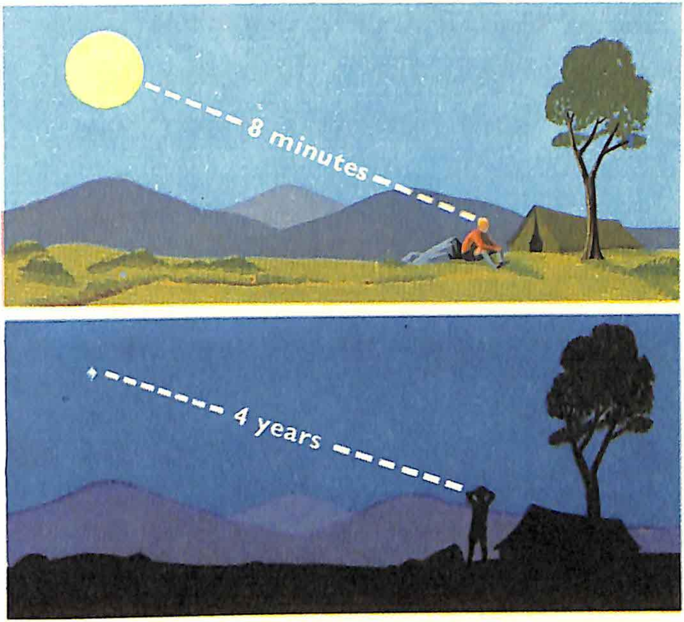
Light travels in straight lines, and nothing travels faster. Its speed is 186,000 miles a second!



The Sun is nearly a hundred million miles away. This means that it takes sunlight about eight minutes to reach us. If the Sun could be "switched off" like a torch, we should still see its light for eight minutes.

The next nearest star is so far away that its light takes over four years to reach us.

Some distant stars which can only be seen with the most powerful telescopes are so far away that their light takes millions of years to reach us.



Because light takes time to travel we do not see the stars as they are now, but as they were in the past.

Light is sent out by atoms. When things get hot, the atoms they are made of send out light.

Everyone has seen a red-hot poker. As it gets hotter it looks more orange. Hotter still it looks slightly blue. When it is very hot indeed it looks white. So you can see that the colour of light can give us a guide to the heat, or *temperature*, of a hot object.

Different substances give out light with different colours. This is because they are made of different atoms.

Scientists can recognise atoms by the light they send out. So, with special telescopes, they can find out what the stars are made of.

Not all the light sent out by atoms can be seen with our eyes. The *X-rays* which are used for taking photographs of our bones are really just beams of light.

There is another kind of light used in hospitals. You cannot see the light sent out by a heat-lamp, but you can feel the pleasant warmth of its heat-rays. These heat-rays are just beams of light.

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What is light, and how does it travel?

If you drop a pebble into a pool of water it makes a lot of tiny ripples. Watch these water-waves as they move across the surface. The distance between the hump of one wave and the next is called the *wave-length*.

Light travels rather like these water-waves, but not always with the same wave-length. Each kind of light has its own special wave-length, though all light travels at the same speed through space.

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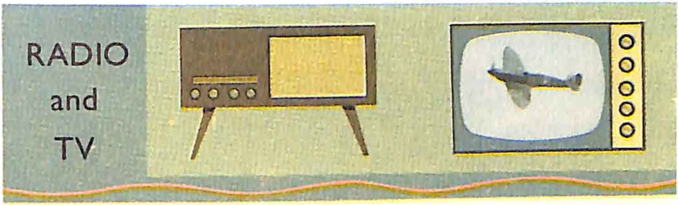
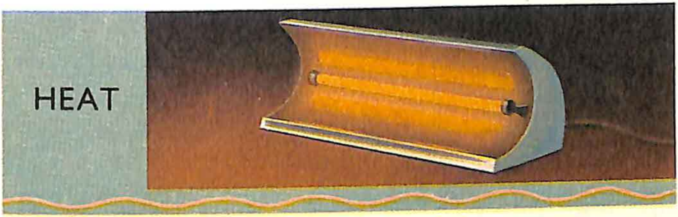
The light we call X-rays has a much shorter wave-length than the light we see with our eyes. Heat-rays which warm us have a longer wave-length than the light we see.

How do radio and television programmes reach us? They are carried through space by waves.

Scientists have discovered that radio-waves and light-waves are really the same things. Radio-waves have a very much longer wave-length than light-waves, but they travel at the same speed as light. Like light-waves, they move in straight lines.


RADIO
and
TV


HEAT

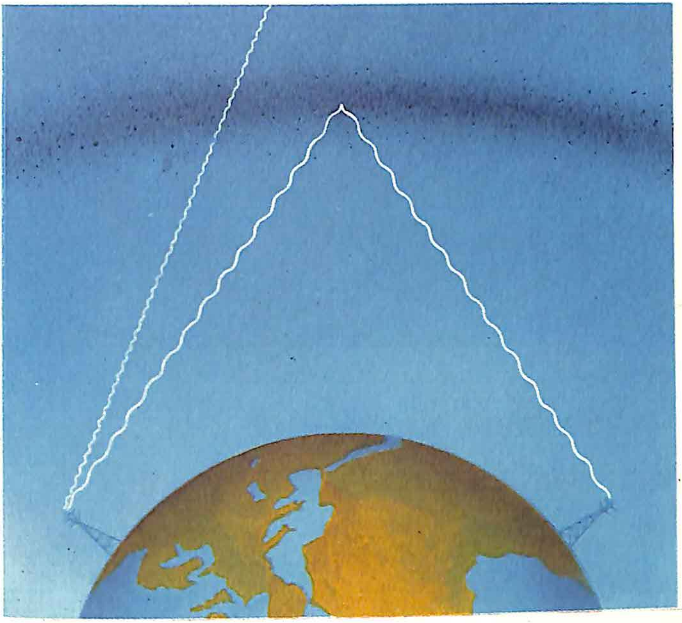
VISIBLE
LIGHT

X-RAYS

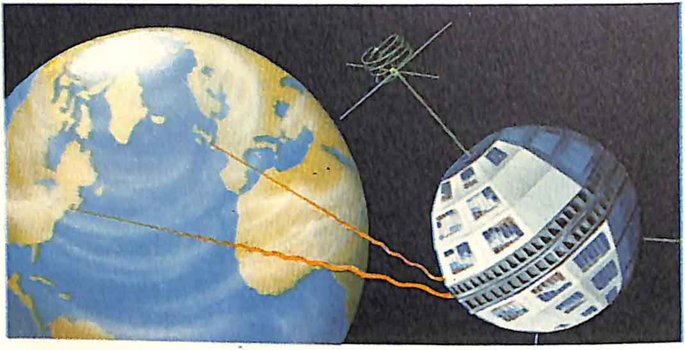
Because the Earth is round and radio-waves travel in straight lines, they cannot be sent very far round the Earth. But they can be reflected, just as light can be reflected by a mirror.

The Earth is surrounded by belts of atoms. One of these belts is about 100 miles above the ground. Short radio-waves can be sent round the world by using this belt of atoms as a reflector.

But the shorter television-waves are not reflected by the belt of atoms, and go straight through.



You can see why it is difficult to send television pictures to other countries.



Nowadays, small but powerful radio stations can be shot up into space by rockets. They move round the Earth rather like the Moon.

They pick up television programmes and send them back to other parts of the world.

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# READ ABOUT SCIENCE

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Illustrated by Ric Wylam

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